

WHAT IS CLAIMED IS:

1. A transmitter apparatus comprising:
an encoder and modulator that generates an encoded and modulated transmit signal from an input signal;
a digital to analog converter, coupled to the encoder and modulator, for generating an analog representation signal of the encoded and modulated transmit signal;
an effectively continuously valued mapping function that selects an output value for a power amplifier control signal in response to a desired transmit power signal, the effectively continuously valued mapping function comprising a table having a plurality of output values for the power amplifier control signals each with a corresponding desired transmit power value; and
a power amplifier coupled to the analog representation signal and the power amplifier control signal, at least one parameter within the power amplifier being adjusted in response to the power amplifier control signal.
2. The apparatus of claim 1 wherein the desired transmit power signal is an average transmit power signal.
3. The apparatus of claim 1 wherein the desired transmit power signal is a peak transmit power signal.
4. The apparatus of claim 1 wherein the power amplifier control signal is selected in response to a combination of a peak to average power ratio signal and the desired average transmit power signal.
5. The apparatus of claim 1 wherein the power amplifier control signal is an analog signal.
6. The apparatus of claim 1 wherein the power amplifier control signal is a digital signal.

7. The apparatus of claim 1 wherein the mapping function selects the output values within the function such that each corresponding transmit power value results in an optimized transmitter power efficiency value while still meeting out of band spurious emissions and waveform quality requirement.

8. The apparatus of claim 1 wherein the at least one parameter within the power amplifier is at least one of a bias, a power supply voltage, a stage switch-in feature, a stage switch-out feature, a turning on feature, a turning off feature, a gain, a gain distribution, a conducting angle, an amplifier class change feature, a load, or an impedance.

9. The apparatus of claim 1 wherein the at least one parameter is any transmitter apparatus parameter that affects transmitter efficiency.

10. The apparatus of claim 1 wherein the desired transmit power signal is converted to an analog signal prior to being input to the mapping function.

11. A transmitter apparatus in a wireless mobile device, the apparatus comprising:
an encoder and modulator that generates an encoded and modulated transmit signal from an input signal, and generates a data indicator signal corresponding to the type of encoded and modulated transmit signal;

a digital to analog converter, coupled to the encoder and modulator, for generating an analog representation signal of the encoded and modulated transmit signal;

a first mapping function, coupled to the encoder and modulator, that generates a peak to average power ratio signal in response to the data indicator signal;

a summer that generates a peak transmit power signal by summing the peak to average power ratio signal and a desired average transmit power signal;

a second mapping function that generates an effectively continuously valued power amplifier control signal in response to the peak transmit power signal, the second mapping function comprising a table having a plurality of power amplifier control signal values each corresponding to a peak transmit power value;

an automatic gain control amplifier, coupled to the digital to analog converter, for generating an amplified analog representation signal in response to the desired average transmit power signal; and

a power amplifier with an input port coupled to the amplified analog representation signal and a control port coupled to the power amplifier control signal, at least one parameter of the power amplifier being adjusted in response to the power amplifier control signal such that the amplified analog representation signal is transmitted at an desired power value with optimized power efficiency while still meeting out of band spurious emissions and waveform quality requirements.

12. The apparatus of claim 11 wherein the first mapping function comprises a table of a plurality of peak to average power ratio values each having a corresponding data indicator.

13. The apparatus of claim 11 and further including a digital to analog converter coupled between the second mapping function and the power amplifier such that the power amplifier control signal is converted to an analog representation of the power amplifier control signal.

14. The apparatus of claim 11 wherein the power amplifier control signal is an analog signal that is low pass filtered prior to the power amplifier.

15. The apparatus of claim 11 wherein the peak transmit power signal is converted to an analog signal prior to being input to the second mapping function.

16. A transmitter apparatus in a wireless mobile device, the apparatus comprising an encoder and modulator that generates an encoded and modulated transmit signal from an input signal, and generates a data indicator signal corresponding to the type of encoded and modulated transmit signal;

a digital to analog converter, coupled to the encoder and modulator, for generating an analog representation signal of the encoded and modulated transmit signal;

a first mapping function, coupled to the encoder and modulator, that generates a peak to average power ratio signal in response to the data indicator signal;

a desired power indicator generator that generates a desired average transmit power signal in response to an open loop power control signal and a closed loop power control signal;

a summer that generates a peak transmit power signal by summing the peak to average power ratio signal and the desired average transmit power signal;

a second mapping function that generates an effectively continuously valued power amplifier control signal in response to the peak transmit power signal, the second mapping function comprising a table having a plurality of power amplifier control signal values each corresponding to a peak transmit power value;

an automatic gain control amplifier, coupled to the digital to analog converter, for generating an amplified analog representation signal in response to the desired average transmit power signal; and

a power amplifier with an input port coupled to the amplified analog representation signal and a control port coupled to the power amplifier control signal, at least one parameter of the power amplifier being adjusted in response to the power amplifier control signal such that the amplified analog representation signal is transmitted at the desired power value with optimized power efficiency while still meeting out of band spurious emissions and waveform quality requirements.

17. A transmitter apparatus comprising:

an encoder and modulator that generates an encoded and modulated transmit signal from an input signal;

a digital to analog converter, coupled to the encoder and modulator, for generating an analog representation signal of the encoded and modulated transmit signal;

a plurality of mapping functions that each select an effectively continuously valued control signal for at least one device within the transmitter apparatus in response to a desired transmit power signal, the plurality of mapping functions each comprising a table having a plurality of control signal values each with a corresponding desired transmit power value; and

at least one device within the transmitter having a plurality of control ports input, each control port input coupled to a mapping function of the plurality of mapping functions such that

at least one parameter of the transmitter apparatus is adjusted in response to at least one of the plurality of control signals.

18. The apparatus of claim 17 wherein the transmit power signal or transmit power value is a desired average transmit power signal or average transmit power value.

19. The apparatus of claim 17 wherein the said transmit power signal or transmit power value is a peak transmit power signal or a peak transmit power value.

20. The apparatus of claim 17 wherein the said at least one device within the transmitter is a power amplifier, a stage or stages of a power amplifier, a drive amplifier, an AGC amplifier, a power supply to a power amplifier and/or other devices in a transmitter, a mixer, a matching network, a filtering means, a power combining or coupling means, a charging means, a voltage or current generation or regulation means, or other means, or a combination of these.

21. The apparatus of claim 17 wherein the said at least one parameter includes a bias, a power supply voltage, a stage switch-in feature, a stage switch-out feature, a turning on feature, a turning off feature, a gain, a charging duty cycle, a conducting angle, an amplifier class change feature, a load, or an impedance.

22. The apparatus of claim 17, wherein said mapping function is multidimensional.

23. The apparatus of claim 22, wherein said mapping function includes an input variable associated with a transmitter temperature.

24. The apparatus of claim 22, wherein said mapping function includes an input variable associated with a battery voltage.

25. A method for optimizing transmitter power efficiency in a transmitter apparatus, the method comprising:

generating an encoded and modulated signal from a digital input signal;
converting the encoded and modulated signal into an analog transmit signal;
generating a desired transmit power level value; and
continuously mapping the desired transmit power level value to a control signal value for
at least one device within the transmitter apparatus to achieve an optimized transmitter power
efficiency,
wherein each transmit power level results in the optimized transmitter power efficiency
while still meeting out of band spurious emissions and waveform quality requirements.

26. The method of claim 25, wherein said at least one device within the transmitter is
a power amplifier.

27. The method of claim 25, wherein said control signal is a power amplifier control
signal.

28. The method of claim 25 and further including generating an automatic gain
control amplifier control signal in response to the desired transmit power level value.

29. The method of claim 25 wherein the desired transmit power level is derived from
an open loop power control signal and a closed loop power control signal.

30. A method for optimizing transmitter power efficiency in a transmitter apparatus,
the method comprising:

generating an encoded and modulated signal from a digital input signal and also
generating a data indicator signal corresponding to the encoded and modulated signal;
converting the encoded and modulated signal into an analog transmit signal;
selecting, in response to the data indicator signal, an output peak to average power ratio
signal value from an array of peak to average power ratio signal values each having a
corresponding data rate or data format;
generating a desired transmit power level signal value;
summing the desired transmit power level signal value and peak to average power ratio
signal value to generate a peak transmit power level signal value; and

continuously mapping the value of the peak transmit power level signal to a value of a at least one control signal for at least one device within said transmitter apparatus that controls at least one parameter within said transmitter apparatus to achieve an optimized power efficiency of the transmitter apparatus,

wherein each transmit power level results in the optimized transmitter power efficiency while still meeting out of band spurious emissions and waveform quality requirements.

31. The method of claim 30 wherein said at least one device within said transmitter apparatus is a power amplifier.

32. The method of claim 30, wherein said control signal is a power amplifier control signal.

33. The method of claim 30 wherein the desired transmit power level is generated in response to an open loop power control signal and a closed loop power control signal.

34. The method of claim 30 wherein the control signal is a digital signal and further including converting the control signal to an analog signal prior to adjusting the at least one parameter of said at least one device within said transmitter apparatus.

35. The method of claim 30 and further including low pass filtering the control signal.

36. A mobile device comprising:

a controller that controls operation of the mobile device;

a transmitter apparatus comprising:

an encoder and modulator that generates an encoded and modulated transmit signal from an input signal;

a digital to analog converter, coupled to the encoder and modulator, for generating an analog representation signal of the encoded and modulated transmit signal;

a mapping function that selects an effectively continuously valued output value for a power amplifier control signal in response to a desired transmit power signal, the

mapping function comprising a table having a plurality of output values for the power amplifier control signals each with a corresponding desired transmit power value; and
a power amplifier coupled to the analog representation signal and the power amplifier control signal, at least one parameter within the power amplifier being adjusted in response to the power amplifier control signal.

37. The device of claim 36 and further including a receiver that receives communication signals from a base station.

38. The device of claim 36 wherein each corresponding resulting average transmit power signal results in best possible transmitter power efficiency while still meeting out of band spurious emissions and waveform quality requirements.